WHAT IS CLAIMED IS:

1. A single cell for a solid oxide fuel cell comprising:

a first solid electrolyte showing oxide ion conductivity;

a fuel electrode comprised of a cermet of a catalyst and a second solid electrolyte, the fuel electrode being bonded to one side of the first solid electrolyte; and

an air electrode comprised of a compound of perovskite type transition metal oxide with a third solid electrolyte, the air electrode being bonded to the other side of the first solid electrolyte,

wherein

the first solid electrolyte shows oxide ion conductivity at 1000℃ of 0.07 S/cm or more, and bending strength at ambient temperature of 700 MPa or more, and the second solid electrolyte shows oxide ion conductivity at 1000℃ of 0.20 S/cm or more,

a surface of the fuel electrode is coated with a fuel electrode contact layer comprised of a fuel electrode contact material containing metal particles, and a surface of the air electrode is coated with an air electrode contact layer comprised of an air electrode contact material containing a material of which electric conductivity in a temperature region for power generation is higher than electric conductivity of an air electrode material, and

an aqueous solution where a water-soluble noble metal compound is dissolved in water is previously impregnated into the air electrode.

2. The single cell according to claim 1, wherein the first solid electrolyte is a dispersion strengthened solid electrolyte where scandia-stabilized zirconia containing 3 to 6 mol% of Sc_2O_3 is a parent phase, 0.5 to 5 wt% of Al_2O_3 is dispersed in the scandia-stabilized zirconia, and a crystal phase is mainly comprised of a phase of a tetragonal crystal.

3. The single cell according to claim 2, wherein the Al_2O_3 mainly exists in grain boundaries of the scandia-stabilized zirconia.

4. The single cell according to claim 3, wherein a surface of the first solid electrolyte is made rough by surface treatment.

5. The single cell according to claim 4, wherein the surface treatment is sandblast treatment, and the first solid electrolyte has surface roughness where an Ra value is 0.075 or more and an S value is 16 or less.

6. The single cell according to claim 5, wherein the fuel electrode is comprised of a cermet of Ni and scandia-stabilized zirconia containing 9 to 12 mol% of Sc_2O_3,

the fuel electrode contact material is slurry containing at least an Ni particle and a binder,

the air electrode is comprised of a compound of perovskite type transition metal oxide selected from the group consisting of $La_{1-x}Sr_xMnO_3$ (wherein $0.1 \leqq x \leqq 0.5$), $Pr_{1-x}Sr_xMnO_3$ (wherein $0.1 \leqq x \leqq 0.5$) and $La_{1-x}Sr_xCo_{1-y}Fe_yO_3$ (wherein $0.1 \leqq x \leqq 0.5$, $0.1 \leqq y \leqq 0.5$) with yttria-stabilized zirconia containing 8 to 10 mol% of Y_2O_3,

the air electrode contact material is slurry containing at least an $La_{1-x}Sr_xCoO_3$ (wherein $0.1 \leqq x \leqq 0.5$) powder and a binder.

7. The single cell according to claim 6, wherein

the scandia-stabilized zirconia constituting a part of the fuel electrode further contains 2 mol% or less of at least one selected from the group consisting of CeO_2 and Y_2O_3, and

a crystal phase of the scandia-stabilized zirconia is mainly comprised of a phase of a cubic crystal.

8. The single cell according to claim 7, wherein the water-soluble noble metal compound is a water-soluble palladium compound.

9. The single cell according to claims 8, wherein

the first solid electrolyte is formed in a plate shape, and

thickness of the plate-shaped first solid electrolyte is within 50 to 300 μm.

10. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 9 via a separator.

11. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 3 via a separator.

12. The single cell according to claim 2, wherein a surface of the first solid electrolyte is made rough by surface treatment.

13. The single cell according to claim 12, wherein the surface treatment is sandblast treatment, and the first solid electrolyte has surface roughness where an Ra value is 0.075 or more and an S value is 16 or less.

14. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 2 via a separator.

15. The single cell according to claim 1, wherein a surface of the first solid electrolyte is made rough by surface treatment.

16. The single cell according to claim 15, wherein the surface treatment is sandblast treatment, and the first solid electrolyte has surface roughness where an Ra value is 0.075 or more and an S value is 16 or less.

17. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 16 via a separator.

18. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 15 via

a separator.

19. The single cell according to claim 1, wherein

the fuel electrode is comprised of a cermet of Ni and scandia-stabilized zirconia containing 9 to 12 mol% of Sc_2O_3,

the fuel electrode contact material is slurry containing at least an Ni particle and a binder,

the air electrode is comprised of a compound of perovskite type transition metal oxide selected from the group consisting of $La_{1-x}Sr_xMnO_3$ (wherein $0.1 \leqq x \leqq 0.5$), $Pr_{1-x}Sr_xMnO_3$ (wherein $0.1 \leqq x \leqq 0.5$) and $La_{1-x}Sr_xCo_{1-y}Fe_yO_3$ (wherein $0.1 \leqq x \leqq 0.5$, $0.1 \leqq y \leqq 0.5$) with yttria-stabilized zirconia containing 8 to 10 mol% of Y_2O_3,

the air electrode contact material is slurry containing at least an $La_{1-x}Sr_xCoO_3$ (wherein $0.1 \leqq x \leqq 0.5$) powder and a binder.

20. The single cell according to claim 19, wherein

the scandia-stabilized zirconia constituting a part of the fuel electrode further contains 2 mol% or less of at least one selected from the group consisting of CeO_2 and Y_2O_3, and

a crystal phase of the scandia-stabilized zirconia is mainly comprised of a phase of a cubic crystal.

21. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 20 via a separator.

22. A solid oxide fuel cell made by stacking a

plurality of the single cells according to claim 19 via a separator.

23. The single cell according to claim 1, wherein the water-soluble noble metal compound is a water-soluble palladium compound.

24. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 23 via a separator.

25. The single cell according to claims 1, wherein

the first solid electrolyte is formed in a plate shape, and

thickness of the plate-shaped first solid electrolyte is within 50 to 300 μm.

26. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 25 via a separator.

27. A solid oxide fuel cell made by stacking a plurality of the single cells according to claim 1 via a separator.